Perspective

Sanitation Systems (/perspective/sanitation-systems-perspective)

Section

Sanitation Systems (/sanitation-systems/sanitation-systems)

Factsheet

System 8: Blackwater Transport to (Semi-) Centralized Treatment System

العربية (/ar/sanitation-systems/sanitation-systems/system-8:-blackwater-transport-to-(semi-)-centralized-treatment-system)

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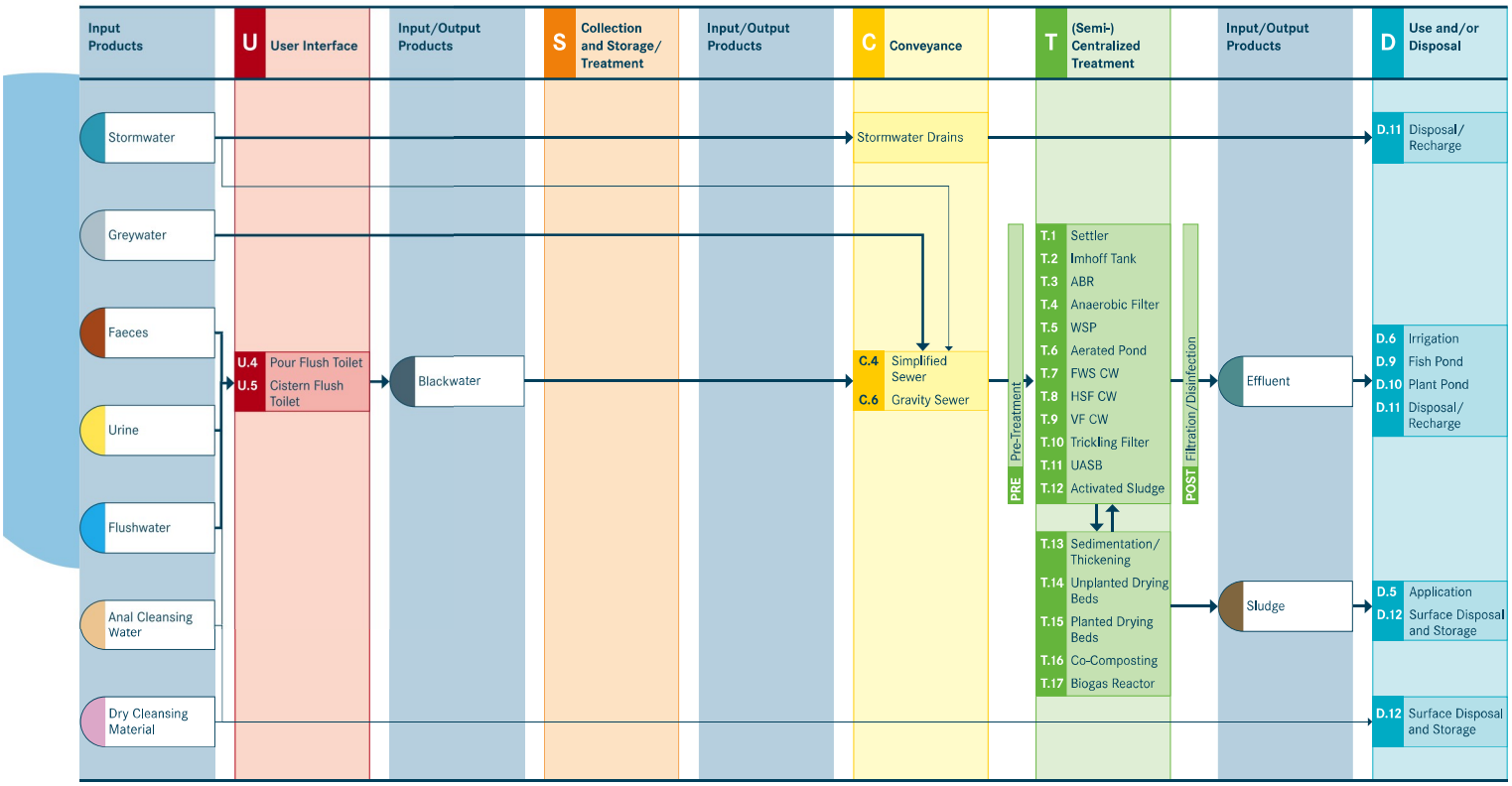
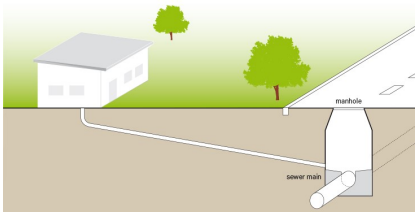
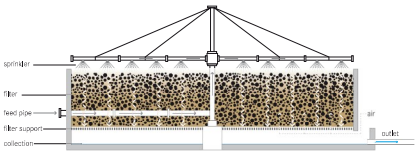
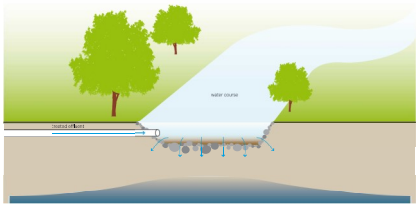
Adapted from

Compendium of Sanitation Systems and Technologies. 2nd Revised Edition (/node/5587)









This is a water-based sewer system in which Blackwater is transported to a **Centralized or Semi-Centralized Treatment facility (/sanitation-technologies#group-t)**. The important characteristic of this system is that there is no **Collection and Storage/Treatment (/sanitation-technologies#group-s)**. Inputs to the system include Faeces, Urine, Flushwater, Anal Cleansing Water, Dry Cleansing Materials, Greywater and possibly Stormwater.

There are two **User Interface (/sanitation-technologies#group-u)** technologies that can be used for this system: a **Pour flush Toilet (/sanitation-systems/sanitation-technologies/pour-flush-toilet)** or a **Cistern Flush Toilet (/sanitation-systems/sanitation-technologies/cistern-flush-toilet)**. A **Urinal (/sanitation-systems/sanitation-technologies/urinal)** could additionally be used. The Blackwater that is generated at the **User Interface (/sanitation-technologies#group-u)** together with Greywater is directly conveyed to a **(Semi-) Centralized Treatment facility (/sanitation-technologies#group-u)** through a **Simplified Sewer (/sanitation-systems/sanitation-technologies/simplified-sewer)** or a **Conventional Gravity Sewer (/sanitation-systems/sanitation-technologies/conventional-gravity-sewer)** network.

Stormwater could also be put into the Gravity Sewer network, although this would dilute the wastewater and require Stormwater overflows. Therefore, local retention and infiltration of Stormwater or a separate drainage system for rainwater are the recommended approaches.

As there is no **Collection and Storage/Treatment (/sanitation-technologies#group-s)**, all of the Blackwater is transported to a **(Semi-) Centralized Treatment facility (/sanitation-technologies#group-t)**. The inclusion of Greywater in the Conveyance technology helps to prevent solids from accumulating in the sewers.

A combination of the technologies **Settler (/sanitation-systems/sanitation-technologies/settler)**, **Imhoff Tank (/sanitation-systems/sanitation-technologies/imhoff-tank)**, **Anaerobic Baffled Reactor (ABR) (/sanitation-systems/sanitation-technologies/anaerobic-baffled-reactor-(abr))**, **Anaerobic Filter (/sanitation-systems/sanitation-technologies/anaerobic-filter)**, **Waste Stabilization Ponds (WSP) (/sanitation-systems/sanitation-technologies/waste-stabilization-ponds-(wsp))**, **Aerated Pond (/sanitation-systems/sanitation-technologies/aerated-pond)**, **Free-Water Surface Constructed Wetland (/sanitation-systems/sanitation-technologies/free-water-surface-constructed-wetland)**, **Horizontal Subsurface Flow Constructed Wetland (/sanitation-systems/sanitation-technologies/horizontal-subsurface-flow-constructed-wetland)**, **Vertical Flow Constructed Wetland (/sanitation-systems/sanitation-technologies/vertical-flow-constructed-**

wetland), **Trickling Filter (/sanitation-systems/sanitation-technologies/trickling-filter)**, **Upflow Anaerobic Sludge Blanket Reactor (UASB) (/sanitation-systems/sanitation-technologies/upflow-anaerobic-sludge-blanket-reactor-(uasb))**, **Activated Sludge (/sanitation-systems/sanitation-technologies/activated-sludge)** is required for the treatment of the transported Blackwater. The Sludge generated from these technologies must be further treated in a dedicated Sludge treatment facility (**Sedimentation/ Thickening Ponds (/sanitation-systems/sanitation-technologies/sedimentation/-thickening-ponds)**, **Unplanted Drying Beds (/sanitation-systems/sanitation-technologies/unplanted-drying-beds)**, **Planted Drying Beds (/sanitation-systems/sanitation-technologies/planted-drying-beds)**, **Co-Composting (/sanitation-systems/sanitation-technologies/co-composting)**, **Biogas Reactor (/sanitation-systems/sanitation-technologies/biogas-reactor)**) prior to **Use and/or Disposal (/sanitation-technologies#group-d)**.

Options for the **Use and/or Disposal (/sanitation-technologies#group-d)** of the treated Effluent include **Irrigation (/sanitation-systems/sanitation-technologies/irrigation)**, **Fish Pond (Aquaculture) (/sanitation-systems/sanitation-technologies/fish-pond-(aquaculture))**, **Floating Plant Pond (/sanitation-systems/sanitation-technologies/floating-plant-pond)** or discharge to a water body (**Water Disposal / Groundwater Recharge (/sanitation-systems/sanitation-technologies/water-disposal-/-groundwater-recharge)**). After adequate treatment, Sludge can either be used in agriculture (**Application of Sludge (/sanitation-systems/sanitation-technologies/application-of-sludge)**) or brought to a Storage/Disposal site (**Surface Disposal and Storage (/sanitation-systems/sanitation-technologies/surface-disposal-and-storage)**).

Considerations

This system is especially appropriate for dense, urban and peri-urban settlements where there is little or no space for onsite storage technologies or emptying. The system is not well-suited to rural areas with low housing densities. Since the sewer network is (ideally) watertight, it is also applicable for areas with high groundwater tables. There must be a constant supply of water to ensure that the sewers do not become blocked.

Dry Cleansing Materials can be handled by the system or they can be collected and separately disposed of (e.g., **Surface Disposal and Storage (/sanitation-systems/sanitation-technologies/surface-disposal-and-storage)**).

The capital investment for this system can be very high. **Conventional Gravity Sewer (/sanitation-systems/sanitation-technologies/conventional-gravity-sewer)** require extensive excavation and installation that is expensive, whereas **Simplified Sewer (/sanitation-systems/sanitation-technologies/simplified-sewer)** are generally less expensive if the site conditions permit a condominial design. Users may be required to pay user fees for the system and its maintenance. Depending on the sewer type and management structure (Simplified vs. Conventional, city-run vs. community-operated) there will be varying degrees of operation or maintenance responsibilities for the homeowner.

This system is most appropriate when there is a high willingness and ability to pay for the capital investment and maintenance costs and where there is a pre-existing treatment facility that has the capacity to accept additional flow.

Guidelines for the safe use of wasterwater excreta and greywater. Volume IV. Excreta and Greywater Use in Agriculture (/node/1133) have been published by the World Health Organization (WHO) and are referenced on the relevant technology information sheets.

Library References

Compendium of Sanitation Systems and Technologies. 2nd Revised Edition

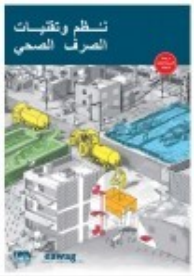
This compendium gives a systematic overview on different sanitation systems and technologies and describes a wide range of available low-cost sanitation technologies.

TILLEY, E. ULRICH, L. LUETHI, C. REYMOND, P. ZURBRUEGG, C. (2014): Compendium of Sanitation Systems and Technologies. 2nd Revised Edition. Duebendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag) **URL (http://www.eawag.ch/forschung/sandec/publikationen/compendium_e/index_EN)** [Accessed: 28.07.2014] **PDF (/sites/default/files/reference_attachments/TILLEY%20et%20al%202014%20Compendium%20of%20Sanitation%20Systems%20and%20Technol**

(/sites/default/files/reference_attachments/TILLEY%20et%20al%202014%20Compendium%20of%20Sanitation%20Systems%2

Further Readings

Compendium of Sanitation Systems and Technologies (Arabic)



This is the Arabic version of the Compendium of Sanitation Systems and Technologies. The Compendium gives a systematic overview on different sanitation systems and technologies and describes a wide range of available low-cost .sanitation technologies

TILLEY, E. ULRICH, L. LUETHI, C. REYMOND, P. SCHERTENLEIB, R. ZURBRUEGG, C. (2014): Compendium of Sanitation Systems and Technologies (Arabic). 2nd Revised Edition. Duebendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag) **PDF (/sites/default/files/reference_attachments/TILLEY%20et%20al%202014%20Arabic%20Compendium%20of%20Sanitation%20Systems.pdf)**

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